



INCITE
Journal of Undergraduate Scholarship
Cook-Cole College of Arts & Sciences
Longwood University

INCITE

The Journal of Undergraduate Scholarship
The Cook–Cole College of Arts and Sciences
Longwood University
2015

Edited by

Ian Karamarkovich
Kristen Gaines-Karpienya

Proofreader

Karen Ingebretsen

Incite Faculty Advisory Board

Dr. Gordon Van Ness,
Chair
Dr. Chris Bjornsen
Dr. Phillip Cantrell
Dr. Tim Holmstrom
Dr. Dina Leech
Mr. Wade Lough
Dr. Brett Martz
Dr. JoEllen Pederson
Mr. Chris Register

Designed by

Jessica Puckette

Cover photograph and photograph of Interim Dean Apperson by

Carson Reeher

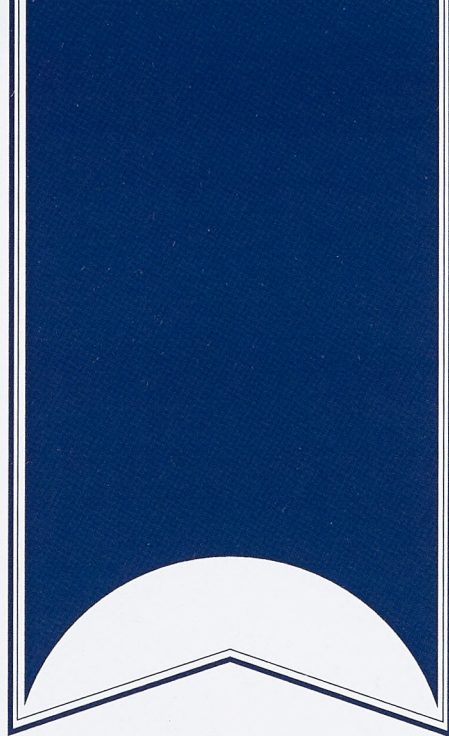
Design produced by



Printed by

Longwood University
Printing Services

Our cover: Affectionately known to Longwood University friends and alumni as "Joanie on the Stonie," Henri-Michel-Antoine Chapu's Joan of Arc at Domrémy is on view in the Rotunda of Ruffner Hall. It was cast by the Boston firm of Caproni Brothers and purchased by the Class of 1914 as a gift to Longwood University (then State Female Normal School). The gift was inspired by class president Maria Adams Bristow Starke's graduation speech, which urged members of the class to exemplify Saint Joan's spirit, courage, and conviction to better the world around them. (source: Longwood Center for the Visual Arts website: http://lcva.longwood.edu/search/node/joan_of_arc)



INCITE

Journal of Undergraduate Scholarship
Cook-Cole College of Arts & Sciences
Longwood University

Table of Contents

- 4 – 5 *Introduction from the Interim Dean*
- 6 – 17 *Spatial Analysis of Potential Risk Factors Associated with Addition of Atlantic Coast Pipeline through Virginia* by Rachel C. Lombardi
- 18 – 19 *“Delicate Matters With No Speaking,” “Hope and Nothing,” “Mono Duality”* by Ben Osterhout
- 20 – 21 *“Connect” Graphic Design Senior Project* by Lindsay Graybill
- 22 – 26 *Phenolic Acids in Brassicaceae Plants: Ovipositional Stimulants or Deterrents for Cabbage White Butterfly, *Pieris rapae*?* by Rebecca E. Dey and Skyler T. Carpenter
- 27 *“Abecedarian Cards”* by Emma Beckett, Jason Ware, and Mollie Andrews
- 28 *Helvetica: A Type Specimen Book* by James Bates, Landon Cooper, Tiffani Jeffries, and Maria Wheaton
- 29 *Things Left Behind* by Dallas Price
- 30 *Heretic Adornment* by Laura Kahler
- 31 *Photography* by Sarah Charlton
- 32 – 37 *Revisiting Longfellow: Expressing Universality through Accessibility* by Anna Bultrowicz
- 38 Magazine spreads from *What Dreams May Come: Marriage Across Cultures* by Emily Spittle
- 39 Magazine spreads from *Live on the Street: A Naked Look at Human Sex Trafficking* by Erin Godwin
- 40 *Lasting Light* by Eamon Brokenbrough



Dr. Jennifer Apperson, Interim Dean,
Cook-Cole College of Arts and Sciences

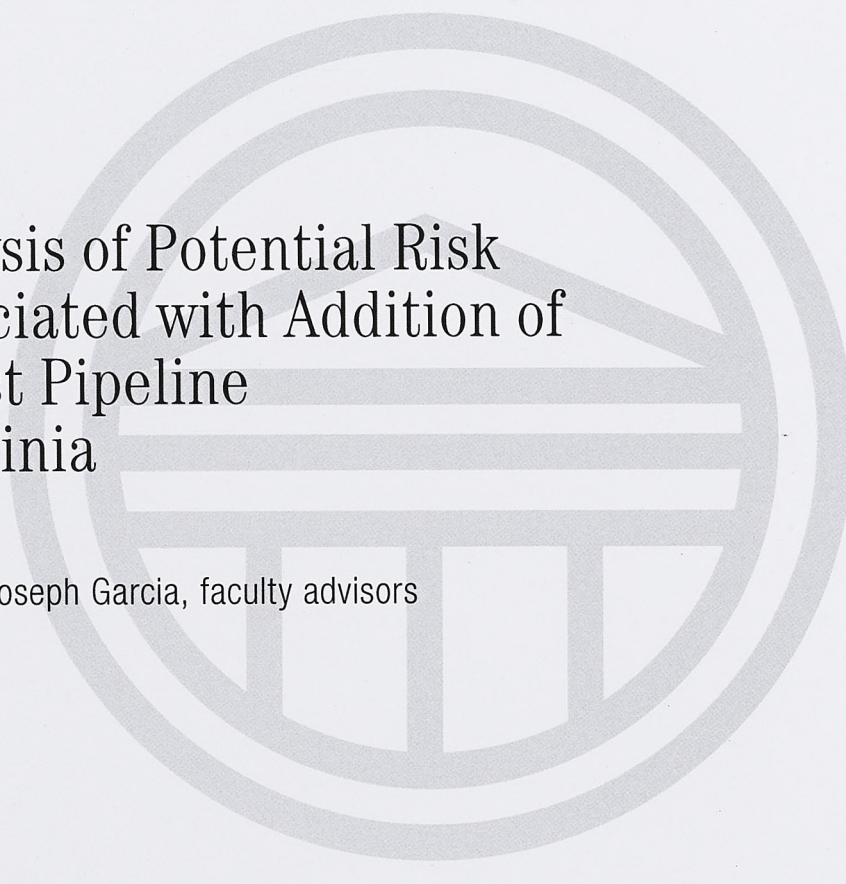
Introduction from the Dean

It is my pleasure to present you with the seventh edition of Incite. In this journal you will find carefully selected examples of undergraduate research and creative works from students in the Cook-Cole College of Arts and Sciences at Longwood University. The cover designs, magazine layout and most of the copy editing are the result of student efforts. I am very proud of the professional quality work they have produced. The faculty mentors and I are very pleased to be able to share these works with you.

Longwood University values providing students with opportunities to collaborate with faculty on research and creative projects so that students learn, not only the mechanics of music, art or research design and execution but also come to appreciate the joy of new discovery. It is my hope that this joy of discovery will follow them beyond their years at Longwood as they become leaders in their communities taking with them an appreciation for beauty and a life-long thirst for knowledge.

Thank you for taking the time to peruse Incite. I would like to thank the student contributors and their faculty mentors for all of their hard work. I would also like to thank the faculty board, the students of Design Lab and our editors. Particular thanks go to Dr. Gordon Van Ness for leading this project.

I hope you enjoy this volume of Incite!



Spatial Analysis of Potential Risk Factors Associated with Addition of Atlantic Coast Pipeline Through Virginia

Rachel C. Lombardi

Dr. Kathy Gee and Dr. Joseph Garcia, faculty advisors

awarded for best research paper

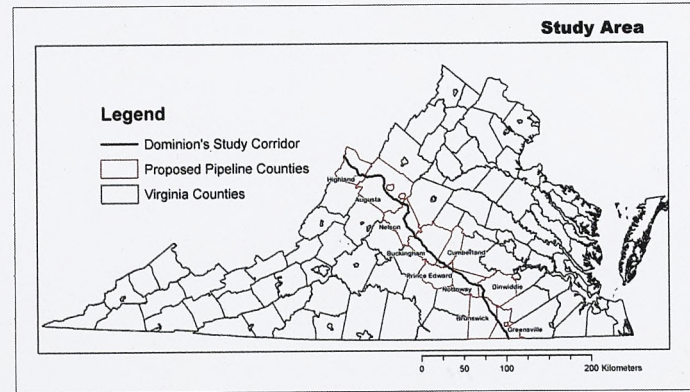
Introduction

Over 728 billion cubic meters (bcm) of dry natural gas was consumed in the United States (U.S.) in 2013, and 24% of U.S. household energy is produced by natural gas (USEIA, 2013; Jaramillo et al., 2007). Due to a growing demand for natural gas, Dominion Inc., in partnership with Duke Energy, Piedmont Natural Gas, and AGL Resources, is planning to develop the Atlantic Coast Pipeline (ACP), which is estimated to be in service by 2018 (Adams et al., 2011; Chmura, 2014). This natural gas pipeline would provide natural gas to West Virginia, Virginia and North Carolina. The planned pipeline will be buried infrastructure and will be approximately 892 kilometers long; it will have a 107-centimeter diameter in Virginia and it has the capacity for 42,000,000 bcm/day. Dominion has identified a 122 meter –wide corridor through which the pipeline will run, which

falls within ten Virginia counties: Highland, Augusta, Nelson, Buckingham, Cumberland, Prince Edward, Nottoway, Brunswick, Dinwiddie and Greenville (figure 1).

An economic analysis by Chmura Economics & Analytics identifies many anticipated benefits associated with the pipeline construction (Chmura, 2014). It is expected that the ACP will increase competition amongst natural gas companies and increase flexibility of buyer options, creating the potential to lower gas prices. Between 2014 and 2019 an estimated 8,800 jobs, \$1.4 billion in total pipeline spending and \$14.6 million in individual and corporate income tax revenue will be introduced into Virginia's economy (Chmura, 2014). After the construction period ending in 2019, pipeline operation will create an estimated 118 jobs, \$37.8 million, and \$233,000 in tax revenue per year (Chmura, 2014).

Figure 1. The proposed pipeline corridor and corresponding counties within the state of Virginia (Dominion Transmission, 2014).



There are also potential environmental consequences associated with the pipeline construction. One such consequence is the necessity to clear cut forests in order to construct the pipeline, which leads to habit fragmentation which will decrease biodiversity (Jantz et al., 2014). Excavation for the pipeline disturbs the soil, leading to

potential erosion. Offsite soils are often brought in during construction and can change the natural soil composition (Jantz et al., 2014). Additionally, construction activities compact soils, which has negative effects of vegetation rooting and soil saturation and can ultimately lead to increased run-off and erosion (Jantz et al., 2014). Finally, the

production and transport of natural gas are accompanied by the release of methane gas, a potent greenhouse gas (Howarth et al., 2011).

Natural gas is often considered a preferred fossil fuel for consumption as the U.S. transitions to lower carbon emission energy practices, as it produces fewer carbon dioxide (CO₂) emissions than coal during the combustion process (Jaramillo et al., 2007). However, the combustion of natural gas releases more methane than coal, and methane is a more potent greenhouse gas (GHG) than CO₂ as it has the potential to cause 20% more heating of the atmosphere when considered gram for gram (EPA, 2014; Howarth et al., 2011). Unfortunately, there is little knowledge regarding the magnitude of methane emitted by natural gas; therefore, a rush to utilize natural gas in an attempt to cut down on CO₂ emissions exacerbate climate change, as methane will

cause greater heating in less abundance (Howarth et al., 2011).

Conventional natural gas was the first source of natural gas and was found in easily accessible reservoirs of hydrocarbon gas which had escaped their deeper source beds. It was consumed widely throughout the 20th century, with production reaching 6 trillion cubic meters in 1970 (Kerr, 2010). Production dropped to 3 trillion cubic meters in 2008 due to diminishing reserves (Kerr, 2010). Consequently, shale natural gas, a natural gas source still trapped within its source bed, became the “unconventional” supplement to the declining conventional reservoirs; however, it was only accessible via the process of hydraulic fracturing. During the process of hydraulic fracturing, approximately 11 to 15 million liters (3 to 4 million gallons) of pressurized water mixed with sand and chemicals are used to

release natural gas (Kerr, 2010). This process has been shown to emit up to 30% more methane than the recovery of conventional natural gas (Howarth et al., 2011).

Another concern regarding the ACP is that the corridor passes along the edges of the Central Virginia Seismic zone, which has a higher potential for seismic activity than the rest of Virginia (USGS, 2014b). The Central Virginia Fault zone is an intraplate fault zone, which is an area of strain within a continent’s interior (Talwani, 1999). An intraplate fault zone can often be more damaging to humans than an interpolate fault (which is strain along a plate boundary) due to the general lack of understanding and preparedness among communities (Talwani, 1999).

In addition to the Central Virginia Fault zone, the pipeline is projected to cross numerous rivers, most of which are located within the

Chesapeake Bay watershed, and several conservation areas. In the event that the integrity of the pipeline was comprised via seismic activity, normal wear and tear, etc., water quality of nearby water bodies would be threatened. Conservation lands, where intact forests are protected, serve a vital role in biodiversity and watershed health. Often, forests are conserved for the purpose of providing clean water to cities within the watershed minimizing the need for extensive water treatment costs (Dudley and Stolton, 2003).

This project aims to characterize environmental risk factors associated with the construction of the ACP pipeline via a spatial analysis.

Methods

This project focused on the portion of the pipeline located within the state of Virginia—specifically, the ten counties listed previously. All analyses were performed using

Table 1. Summary of data used in analyses.

Feature	Brief Description	Source
Virginia Counties	County boundaries within the state of Virginia	ESRI, 2012
Proposed Pipeline Corridor	Map image depicting the proposed path of the pipeline	Dominion Transmission, 2014
Hydrology	Location and characteristics of surface water bodies	USGS, 2014a
Watershed Boundaries	Subregion drainage areas within Virginia not affiliated with any political boundaries	USGS, 2014a
Conservation Lands	Boundaries for lands of conservation and recreational interest in Virginia in the form of National/State Parks and Wildlife Management Areas	VDCR, 2014
Seismic Hazard	Probability of ground motion shaking	USGS, 2014b
Fault Zone Areas	Location of faults in relation to folds associated with earthquakes within the last 1,600,000 years	USGS, 2014c

ArcGIS 10.1, a geographic information systems software package (ESRI, 2012). Because the pipeline is located predominantly in the southern portion of Virginia, all maps are projected in NAD 1983 StatePlane Virginia South FIPS, as this projection resulted in the least distortion within the area of interest. Table 1 summarizes the data acquired for analysis.

Map images provided by Dominion of the ACP study corridor were used to digitize a polyline feature in ArcMap 10.1. The digitized study corridor was superimposed on the hydrology dataset to determine where intersections occurred. The study corridor was also overlaid with the conservation land dataset to determine which protected areas would be affected by construction and maintenance of a pipeline. Finally, a seismic hazard map was symbolized as a choropleth map to show areas of greater probability of

ground motion due to strain release, and the fault area dataset was added to depict general fault zone locations. The study corridor and hydrology data were overlaid onto this layer as well to show areas at greatest risk of infrastructure damage due to seismic activity, as well as rivers that would be subject to contamination in the event of pipeline failure.

Results/ Discussion

Virginia has faults that trend from NE to SW and extend from NW of Goochland to Prince Edward and Buckingham County, commonly referred to as the Central Virginia Seismic Zone. Figure 2 displays the locations of these faults as well as peak ground acceleration (PGA) of areas with at least 2% probability of exceedance within the next 50 years. PGA is a measurement of earthquake acceleration of the ground, or shaking intensity. PGA is measured in percent gravity (%g),

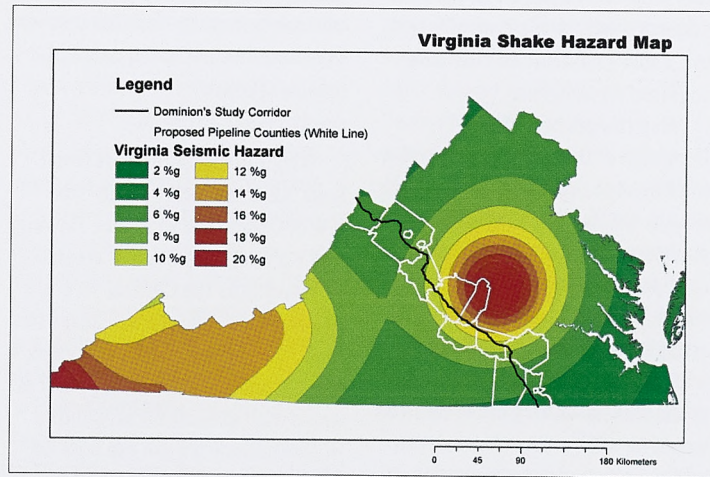


Figure 2. A chloropleth map of peak ground acceleration (earthquake) with a 2% probability of exceedance in the next 50 years. The areas with higher probability have a higher likelihood of experiencing seismic shaking, which can result in infrastructure damage and potential danger to humans.

which is related to the Modified Mercalli Intensity Scale to determine perceived shaking in a given area (USGS, 2014d). Therefore, 6 %g areas would be experiencing moderate (3.9–9.2 %g) perceived shaking and in the 10 percent gravity areas would be experiencing strong (9.2–18 %g) perceived shaking. The proposed pipeline corridor falls within an area of Virginia that has a PGA ranging from approximately 4 to 14 %g relating to moderate to strong perceived shaking. Table 2 shows the percentage of pipeline located within each shake hazard rating.

While there is certainly the potential for seismic shaking in the Central Virginia area, there is very little, if any, information available regarding the hazards associated with natural gas pipelines in areas prone to seismic shaking. A study prepared for FEMA reports a lack of adequate earthquake consideration,

if any at all, in pipeline engineering standards in the central and eastern U.S. due to an infrequency of seismic activity (Yokel, 1992). However, these areas have historically seen earthquakes large enough to cause strong shaking and serious damage (Talwani and Schaeffer, 2001). A buried pipeline will typically move with surface seismic wave; however, if shear (S) waves, which travel perpendicular to the surface, were to rupture the pipeline, groundwater would be at risk of contamination similar to the observed phenomenon of groundwater contamination due to leaking well infrastructure. Contamination would include high levels of dissolved methane, which has explosive potential (Osborn et al., 2011). Additionally, nine valves found along the pipeline in Virginia could easily be broken in a seismic event, which will release highly flammable methane gas in the air. An automatic shut-off valve has

Table 2. Length of pipeline and river intersections located within each shake hazard rating category within Virginia.

Shake Hazard Rating	Percent (%) of Pipeline within Each Rating	Rivers Intersecting Pipeline	Corresponding Watershed
4 % g	5	Fountain Creek	Chowan- Roanoke
6 % g	37	Jennings Branch Middle River	Potomac
8 % g	20	South River Back Creek	Potomac
		Rockfish River (2)*	Lower Chesapeake
		Nottoway River	Chowan- Roanoke
10 % g	14	James River	Lower Chesapeake
12 % g	17	N/A	N/A
14 % g	7	Appomattox river	Lower Chesapeake

* Rockfish River is intersected twice by the pipeline

Figure 3. The proposed ACP pipeline corridor and corresponding watersheds.

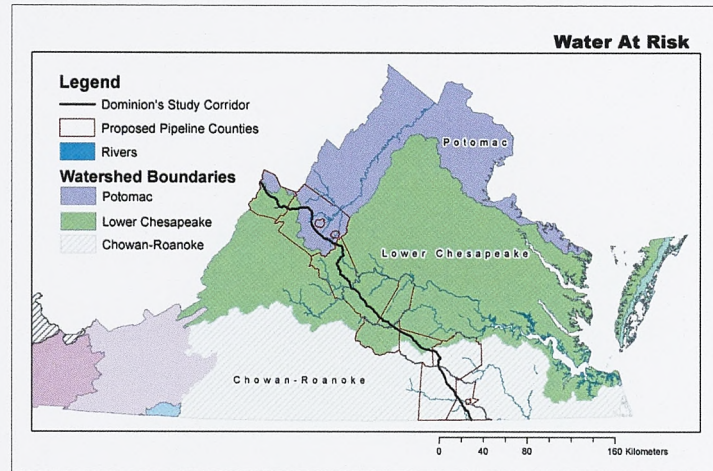
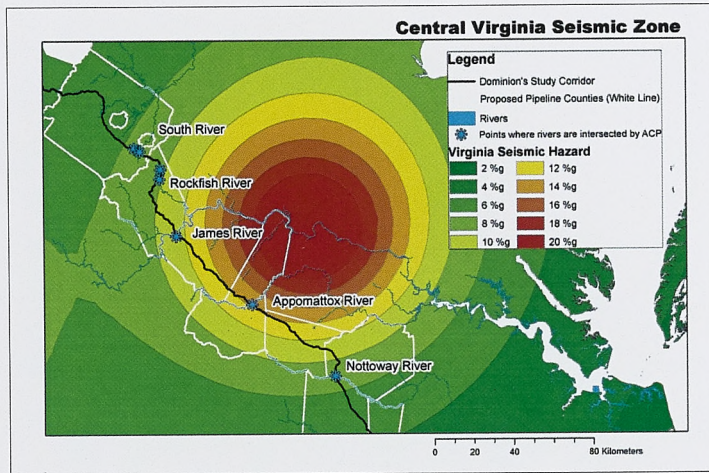


Figure 4. River/pipeline intersections within the Central Virginia Seismic Zone.



the potential to prevent this, but it would require detection equipment to have an extremely rapid response to change in pressure. Response to a rupture would take a considerable amount of time to repair even if discovery of failure was immediate. These failures would be catastrophic to the environment as a rupture of the pipeline transporting 42,000,000 bcm/day of natural gas would immediately leak a large magnitude of contaminants.

Furthermore, studies have shown that surface processes causing sedimentation of continental margins have been correlated with increased intraplate seismicity (Westaway, 2006; Calais et al., 2010; Guerroué and Cobbold, 2006). For example, deglacial melts occurring between 16 and 10 billion years ago in North America lead to extensive sedimentation in the Mississippi delta, causing flexure in the lithosphere. This triggered reactivation of the New Madrid

Fault Area (located around the intersection of Kentucky, Arkansas, Tennessee, Illinois and Missouri), which caused a historic increase in the number of earthquakes in that area (Calais et al., 2010). In other words, erosion in one area and the resulting loading downstream can result in crustal deformation, thus causing strain in fault areas and leading to increased seismic activity. As the Chesapeake Bay has historically experienced significant sedimentation and erosion due to erosive agricultural practices in the late 1700's through the late 1800's, it is possible that the Central Virginia area could experience an increase in the frequency and intensity of seismic activity in the future. If realized, this scenario would create an even greater chance of pipeline damage due to seismic shaking.

Nine rivers traverse the proposed ACP study corridor, with the Rockfish River being intersected

twice (Table 2). As shown in Figure 3, four of the rivers are tributaries of the Potomac River, all within the Chesapeake Bay watershed (ICPRB, 2012). The Rockfish, James and Appomattox Rivers also contribute to the Chesapeake Bay, which is the largest estuary and one of the largest fisheries in the United States (Baird and Ulanowicz, 1989). Dominion released a report that detailed the two methods by which the pipeline will cross a waterbody: trenching through a waterbody and boring underneath the waterbody (Dominion Transmission, 2014). The proposed pipeline serves as a threat to these rivers (especially those subjected to trenching) and, ultimately, the Bay, during both the construction and operational periods. During construction, sedimentation of the rivers and streams can occur via the trenching process or the transportation of excess soil during rain events. Any machine failure in or around

the river can release contaminants such as gasoline or hydraulic fluids. Additionally, riparian vegetation will be removed to allow construction equipment to cross the waterbody and temporary bridges to be installed, which increases the risk of streambank erosion.

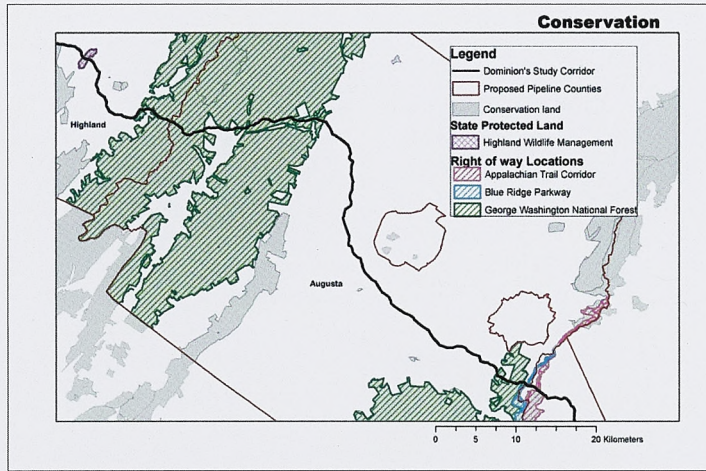
Scientists at the Fernow Experiment Forest in West Virginia were able to observe construction of a natural gas pipeline, albeit at a much smaller scale than the proposed ACP, that occurred within a forested area and intersected several wetlands (Adams et al., 2011). Despite the fact that construction was performed during a period without rainfall and erosion control measures were utilized, an estimated 2.1 metric tons per hectare of soil erosion still occurred. This study shows that, despite preventative measures, erosion can be a primary concern with respect to the construction phase of a pipeline.

The proposed pipeline can serve as a threat to the rivers it intersects even after construction is complete. Increased urbanization in Virginia can cause higher magnitudes of stormwater flows in rivers, which may alter the geomorphology of a stream channel or floodplain via streambank incision, channel cut-offs, or channel migration. These geomorphic changes could potentially expose buried pipeline, thereby exposing the pipeline to the erosive power of running water. Figure 4 depicts the intersections of the proposed pipeline with major rivers within the Central Virginia Seismic Zone. Seven of the ten rivers intersect in this area, all of which are tributaries of the Chesapeake Bay, correspond to a shake hazard rating of 8 %g or greater. Waterbody crossings associated with a higher probability of seismic activity are at increased risk of contamination, as seismic activity can damage the

pipeline, thereby introducing natural gas directly to the waterbody.

The proposed ACP pipeline will traverse several protected areas that are vital in providing balanced ecosystems and clean water to the Chesapeake Bay Watershed (Figure 5) (Dudley and Stolton, 2003). In September 2015, Dominion plans to file for right-of-way grants to land within the George Washington National Forest (GWNF), Appalachian Corridor, and Blue Ridge Parkway (Dominion Transmission, 2014). The GWNF and other protected forests will be facing major disruption to their ecosystems during construction of the pipeline, as a section of land 33.5 m wide must be clear-cut (Dominion Transmission, 2014). Tree growth will be prohibited in this area for the entire stretch of the pipeline (Dominion Transmission, 2014). Spatial analyses revealed that the length of GWNF that

Figure 5. Conservation lands impacted by the proposed ACP pipeline.



must be cleared for the proposed pipeline would be approximately 20 km, or an area of approximately 67 ha. The Appalachian Corridor and Blue Ridge Parkway will lose approximately 2.2 ha and 0.76 ha of conservation land, respectively, to clear-cutting operations. Another protected forest in the ACP's path is Highland Wildlife Management Area, approximately 2.4 ha of which will be subject to clear-cutting; however, Dominion has not yet applied for local permits in this area. In total, approximately 72.6 ha of conservation land will be subject to clear-cutting due to the ACP.

Potential consequences of clear-cutting include increased erosion, which can be extremely harmful to a watershed, as discussed previously, as well as an increased "edge" effect (Adams et al., 2011). The "edge" effect is the removal of habitat from an intact forest, which causes fragmentation and exposure to abiotic

factors such as solar radiation, and can potentially lead to biological changes in predation, fauna success, pollination and species competition (Murcia, 1995). Several endangered species inhabit the GWNF and could be at risk due to removal of tree habitat and trenching associated with pipeline construction (which may potentially affect karst caves), including the Cow Knob Salamander, James spiny mussel, Indiana Bat, Northern Long-Eared bat, and Virginia Big-Eared Bat (Wild Virginia, 2014). Additionally, the quality of water leaving the forests could be diminished due to logging and construction efforts for the pipeline (Fulton and West, 2002). Forestry, or logging, in national forests is comparable to the activities that will occur in pipeline construction, including tree removal, the presences and use of vehicles, and the destabilization of soil layers. These activities can

contaminate water leaving the area by adding sediments, excess nutrients, equipment fluids and thermal pollution (Fulton and West, 2002).

Conclusion

There are numerous economic benefits associated with the construction of the Atlantic Coast Pipeline; however, the risk factors to Virginia's environment are equally numerous. The likelihood of seismic activity in the region of the pipeline's location is a cause for concern, as the pipeline could sustain damage in the event of a seismic event, leading to environmental contamination. The intersection of the pipeline and waterbodies is also problematic, as the waterbodies are subject to the

consequences of upstream erosion, geomorphological changes, and natural gas contamination. Any of these consequences could jeopardize the use of a waterbody for drinking water, recreation or food. As the majority of these waterbodies contribute to the Chesapeake Bay, there could be regional and national consequences and associated negative environmental impacts as well as local. Finally, the health of several protected lands and national forest ecosystems is at risk as well, as approximately 73 ha will be disrupted and deforested during the construction of the ACP.

There are certain economic benefits that accompany the construction of the pipeline; however there

are economic costs that come with the pipeline as well in the form of mitigating environmental hazards and pollution. Forest and surface water degradation, groundwater contamination, and negative impacts on the Chesapeake Bay are all potential costs that would burden the economy and society as a whole. As a society, we must determine how much risk we are willing to take to boost our local and regional economies. Do the economic benefits of the Atlantic Coast Pipeline outweigh the costs? It is a question that our society must ask itself, and there is no easy answer.

References

- Adams, M., Edwards, P., Ford, W., Johnson, J., Schuler, T., Gundy, M. and F. Wood. 2011. Effect of Development of a Natural Gas Well and Associated Pipeline on the Natural and Scientific Resources of the Fernow Experimental Forest. Newtown Square, PA: U.S. Forest Service.
- Baird, D., and R. Ulanowicz. 1989. The Seasonal Dynamics of The Chesapeake Bay Ecosystem. *Ecological Monographs*, 59(4): 329-364.
- Calais, E., Freed, A., Arsdale, R., and S. Stein. 2010. Triggering of New Madrid seismicity by late-Pleistocene erosion. *Nature*, 466: 608-611.
- Chmura. 2014. The Economic Impact of the Atlantic Coast Pipeline in West Virginia, Virginia, and North Carolina. Richmond, Va: Chmura Economics & Analytics.
- Dominion Transmission, Inc. 2014. Resource Report I: General Project Description. Natural Resource Group.
- Dudley, N. and S. Stulton. 2003. Running Pure: The Importance of Forest Protected Areas to Drinking Water. Washington, D.C: The World Bank/WWF Alliance.
- EPA. 2014. Overview of Greenhouse Gases. Washington, D.C.: U.S. Environmental Protection Agency. Available at: <http://epa.gov/climatechange/ghgemissions/gases/ch4.html>. Accessed 11 January 2015.
- ESRI®. 2012. ArcMap™. Ver. 10.1. Redlands, CA.: Esri, Inc.
- Fulton, S. and B. 2002. Chapter 2: Forestry Impacts on Water Quality. In *Southern forest resource assessment*, 501- 517. David N. and Greis, J. G., eds. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station.
- Guerroué, E. L. and P. R. Cobbold. 2003. Influence of erosion and sedimentation on strike-slip fault systems: insights from analogue models. *Journal of Structural Geology*. 28: 421-430.
- Howarth, R., Santoro, R. and A. Ingraffea. 2011. Methane and the greenhouse-gas footprint of natural gas from shale formations. *Climate Change*. 106: 679-690.
- ICPRB. 2012. General Facts & FAQs. Interstate Commission on the Potomac River Basin. Available at: <http://www.potomacriver.org/facts-a-faqs/faqs>. Accessed 11 January 2015.
- Jantz, C., Kubach, H., Ward, J., Wiley, S., and D. Heston. 2014. Assessing Land Use Changes Due to Natural Gas Drilling Operations in the Marcellus Shale in Bradford County, PA. *The Geographical Bulletin*. 55: 18-35.
- Jaramillo, P., Griffin, W., and Matthews, H. 2007. Comparative Life-Cycle Air Emissions Of Coal, Domestic Natural Gas, LNG, And SNG For Electricity Generation. *Environmental Science & Technology*, 41(17): 6290-6296.
- Kerr, R. 2010. Natural Gas From Shale Bursts Onto the Scene. *Science*. 328(5986): 1624-1626.
- Murcia, C. 1995. Edge effects in fragmented forests: implications for conservation. *TREE*. 10(2): 58- 62.
- Osborn, S., Vengosh, A., Warner, N., and R. Jackson. 2011. Methane contamination of drinking water accompanying gas-well drilling and hydraulic fracturing. *Proceedings of the National Academy of Sciences*. 108(20): 8172 - 8176.
- Rozell, D., and Reavan, S. 2012. Water Pollution Risk Associated with Natural Gas Extraction from the Marcellus Shale. *Risk Analysis*, 32(8), 1382-1393.
- Talwani, P. 1999. Fault geometry and earthquakes in continental interiors. *Tectonophysics*. 305: 371-379.

- Talwani, P., & Schaeffer, W. (2001). Recurrence rates of large earthquakes in the South Carolina Coastal Plain based on paleoliquefaction data. *Journal of Geophysical Research*. 106: 6621-6642.
- USEIA. 2013. International Energy Statistics. Washington, D.C.: U.S. Department of Energy. Available at: <http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=3&pid=26&aid=24>. Accessed 4 December 2014.
- USGS. 2014a. Hydrography: Get NHD Data. U.S. Department of the Interior. Available at: <http://nhd.usgs.gov/data.html>. Accessed 4 December 2014.
- USGS. 2014b. Earthquake Hazard Program: Lower Maps and Data. U.S. Department of the Interior. Available at: <http://earthquake.usgs.gov/hazards/products/conterminous/> Accessed 4 December 2014.
- USGS. 2014c. Earthquake Hazard Program: Faults. U.S. Department of the Interior. Available at: <http://earthquake.usgs.gov/hazards/qfaults/>. Accessed 4 December 2014.
- USGS. 2014d. Shake Map Background. U.S. Department of the Interior. Available at: <http://earthquake.usgs.gov/research/shakemap/>. Accessed 11 January 2014.
- Westaway, R. 2006. Investigation of coupling between surface processes and induced flow in the lower continental crust as a cause of intraplate seismicity. *Earth Surface Processes and Landform.*, 31: 1480-1509.
- Wild Virginia. 2014. Atlantic Coast Pipeline. Charlottesville, Va: Wild Virginia. Available at: <http://www.wildvirginia.org/our-programs/dominion-pipeline/>. Accessed 29 December 2014.
- VDCR. 2014. Natural Heritage: Conservation Lands Shapefiles and Metadata. Richmond, Va: Virginia Department of Conservation and Recreation. Available at: http://www.dcr.virginia.gov/natural_heritage/cldownload.shtml. Accessed 4 December 2014.
- VDGIF. 2015. Highland WMA. Virginia Department of Game and Inland Fisheries. Available at: <http://www.dgif.virginia.gov/wmas/detail.asp?pid=28>. Accessed 6 January 2015.
- Yokel, F and R. Mathey. 1992. Earthquake Resistant Construction of Gas and Liquid Fuel Pipeline Systems Serving, or Regulated by, the Federal Government. Washington, D.C.: U.S. Department of Commerce.



"Delicate Matters With No Speaking"

(10.25"h x 11.25"w x 10.25"d)

Earthenware and Underglazes

Wheel thrown earthenware, hand building and manipulation done on the wheel, bisque fired to cone 03, painted with underglazes, final firing to cone 04



"Hope and Nothing"

(11.5"h x 9"w x 9"d)

Stoneware, Underglazes, Glaze

Thrown on the wheel and then bisque fired to cone 05, painted outside and top of inside with underglazes, the rest of inside coated with glaze, final firing to cone 5



"Mono Duality"

(10"h x 10.25"w x 10.75"d)

Earthenware and Underglazes

Wheel thrown earthenware, manipulation of form done on the wheel, bisque fired to cone 03, painted outside and parts of inside with underglazes, area on sides painted with white underglaze and then scratched to show the red clay beneath, final firing to cone 04

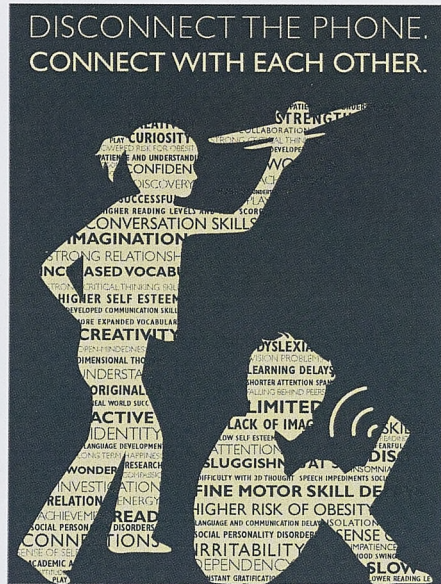
Artist:

Ben Osterhout

Lauren Rice and Adam Paulek, faculty advisors

Throwing on the wheel, I create objects that range in form from classic styled shapes to abstract decorative pieces. I like to use ceramics as a ground for my paintings. I have found that throwing on the wheel is meditative, and the three-dimensionality of the form helps to accentuate my drawings. With my imagery I prefer to leave the meanings ambiguous because I believe that individuals create a stronger bond with a piece when they create their own narratives. Using my cartoon style, I attempt to arrange the figures and patterns in a surreal scene from my subconscious. I am interested in visually exploring the psychology and emotions in beauty, the grotesque, fear, sex, and repetition.

awarded for best artwork



At left, "Connect" poster, 17" x 22" and, at right, "Connect" activities calendar and promotional brochure.

Designer:

Lindsay Graybill

*“Connect”
2014-2015*

*Wade Lough, Christopher Register and Amanda Christensen,
faculty advisors*

Because of the growing availability and portability of gadgets for all age groups, many young parents use technology as a substitute for personal communication and physical contact. They do not realize that children can be negatively affected by this unnatural replacement. My senior project is targeted toward these parents and serves as an educational tool to illustrate proper ways of using both technology and traditional means of interacting with young children.

In my research, I worked with young children and parents to gauge how much technology was involved in their lives by allowing them to choose between a tablet and traditional toys, books, and games. My theory was confirmed as 88% of the children selected the technology to play with and most knew exactly what to do with it.

I did not want my project to be overly didactic or judgmental of parents who use technology; rather, I wanted it to be something that promotes a balance. I created multiple components including a calendar, video, website, brochure, cards, and display piece for parents and professionals to access this information in a variety of ways. These components made up the “Connect” brand with a mission of encouraging families to disconnect the screens, even if just for a little while, and reconnect with each other.



Frames from “Connect” video. In the video, each child has an unprompted choice of playing with either traditional activities or digital games on an iPad.



Phenolic Acids in Brassicaceae Plants: Ovipositional Stimulants or Deterrents for Cabbage White Butterfly, *Pieris rapae*?

Rebecca E. Dey and Skyler T. Carpenter

Dr. Mary E. Lehman, faculty advisor

Abstract

Cabbage white butterflies, *Pieris rapae*, are agricultural pests that lay their eggs on plants of the Brassicaceae (cabbage) family. Upon hatching, the caterpillars then feed on the plants, causing contamination and yield reduction. Female butterflies may identify suitable host plants through the detection of various chemicals produced by the plants. Of particular interest are phenolic acids because they are found in high concentrations in Brassicaceae plants, yet little is known about how they may influence egg-laying (ovipositional) behavior. This study evaluated the potential of four phenolic acids to serve as ovipositional stimulants or deterrents for *Pieris rapae*. Treatments of phenolic acids and deionized water controls were applied to cabbage disks that were equal in leaf surface area and color. Each treated disk was matched with a deionized water control and placed within an experimental enclosure with a single mated female. After 24 hours, the number of eggs laid on each disk was observed and recorded. Two of the phenolic acids (caffeic and sinapic) deterred oviposition, one (cinnamic acid) was a stimulant, and one (vanillic acid) had no significant effect. The combined results of this study and previous research suggest that it may not be possible to make broad generalizations about the effects of phenolic acids on ovipositional choices and underscore the importance of assessing individual chemicals. Understanding what chemicals, and other factors, serve as stimulants or deterrents for oviposition may provide valuable information for avoiding or minimizing the negative effects of *Pieris rapae* on agricultural crops.

Introduction

Cabbage white butterflies (*Pieris rapae*) lay their eggs (oviposit) on plants in the Brassicaceae family, such as cabbage, turnips, and kale (Richards 1940). When the eggs hatch, the caterpillar larvae consume the host plant and use it as their primary food source. The nutritional value of the host plant is therefore critical for the success and development of the caterpillars. In order to increase the female butterfly's fitness, it is advantageous for her eggs to be laid on the best host plants possible. It is thought that females identify suitable plants using visual and olfactory cues (Renwick and Radke 1988; Schoonhoven et al., 2005), including detection of various chemicals (plant secondary metabolites) that are produced by the host plants.

Previous studies have shown that *P. rapae* oviposition is affected by the presence of glucosinolates

and cardenolides in plants of the Brassicaceae family. Glucosinolates were found to stimulate oviposition (Renwick and Radke, 1988), whereas cardenolides were found to deter oviposition (Renwick et al. 1989). However, other classes of chemicals are present in Brassicaceae plants, many of which could also have an effect on the oviposition of *P. rapae*. The secondary metabolites of particular interest are phenolic acids, because they are found in high concentrations in some Brassicaceae plants (Mattlia and Hellstrom, 2007), yet little is known about the role they play in ovipositional choices. The main objective of this study was to evaluate the potential for phenolic acids to serve as ovipositional stimulants or deterrents for *Pieris rapae*.

Methods

Wisconsin Fast Plants®, *Brassica rapa*, were planted in Styrofoam planting units using vermiculite as

a soil-like medium for plant growth. The planting unit consisted of four compartments. One plant seed and two fertilizer pellets were placed in each compartment. The planting units were placed on a watering and nutrient tray reservoir. Through a felt-wick system, the plants were provided with a continuous nutrient and water supply. Plants were then placed in a growth chamber where the environment was controlled. The chamber was maintained at 26° C and provided continuous light. The chamber had a combination of fluorescent and incandescent lighting (1520 Footcandles). After 1–2 weeks of plant growth, we placed *P. rapae* eggs onto the leaves of the plants. The eggs were purchased from Carolina Biological Supply Company. After the caterpillars had grown to a proper size, we removed them from the *Brassica* plants and placed them into plastic cups with lids that provided adequate ventilation for

their survival. Slices of store-bought cabbage were placed in the cups for the caterpillar's primary food source. The cups were cleaned daily and a new food supply was given until their early stages of pupation. Caterpillars were placed onto a sheet of paper inside their enclosures to continue pupation (roughly 1–2 weeks before emergence occurred). Males were identified by one spot on their wings, whereas females had two spots on their wings. After butterfly emergence and the allowance of adequate time for mating (1–3 days) females were selected for the experiments.

Treatments of 1 mM phenolic acids and deionized water (DI H₂O) controls were applied to cabbage disks that were equal in color and leaf surface area (6.4 cm diameter disks). The phenolic acids that were tested individually in this study were sinapic (n=15), vanillic (n=10), caffeic (n=22), and cinnamic (n=13)

acids. Each phenolic acid–treated disk was matched with a DI H₂O control disk and placed at opposite ends of an experimental mesh enclosure (38 cm wide x 61 cm tall cylinder). The female butterflies were able to choose equally between the cabbage disks. One female butterfly was placed in each enclosure.

Females were given 24 hours to lay eggs. The choice of female oviposition and the number of eggs laid on each disk were observed and recorded. Data were analyzed with the JMP® statistical program. Paired t-tests were performed for each phenolic acid experiment to evaluate differences between the number of eggs that a female laid on phenolic acid treatment and control cabbage disks.

Results and Discussion

The complex chemicals produced by plants, called plant secondary metabolites, are thought to play

a major role in the orientation of insects to their host plants and in the avoidance of laying eggs on plants that would be unsuitable for the development of their larvae. However, much is still unknown about the specific chemicals that are responsible for this attraction or deterrence. This study examined the effects of phenolic acids on the ovipositional choices of *Pieris rapae* (cabbage white butterflies). Phenolic acids are aromatic compounds that are ubiquitously produced, but are found in particularly high concentrations in the Brassicaceae host plants of *P. rapae* (Mattlia and Hellstrom, 2007).

In this study, three of the four phenolic acids showed a significant effect ($p < 0.05$) on *Pieris rapae* oviposition. Caffeic and sinapic acids both acted as deterrents; the butterflies laid more eggs on the cabbage disks containing deionized water than they did on the disks

treated with either acid (Figure 1). Cinnamic acid acted as a stimulant; the butterflies preferred the cinnamic acid-treated cabbage disks to the deionized water control disks (Figure 1). Vanillic acid acted as neither a stimulant nor a deterrent. It had no significant effect on oviposition (Figure 1).

Previous research done by Walker et al. (2014) found that *p*-coumaric and ferulic acids had a significant stimulatory effect on *P. rapae* oviposition on intact *Brassica rapa* plants. Walker et al. (2014) also found that protocatechuic and salicylic acids did not significantly affect oviposition.

Taken together, the results of this study and that of Walker et al. (2014) provide evidence that phenolic acids have a broad range of effects on *P. rapae* oviposition. The effects range from stimulatory, to deterrent, to having no effect. Results from both studies show

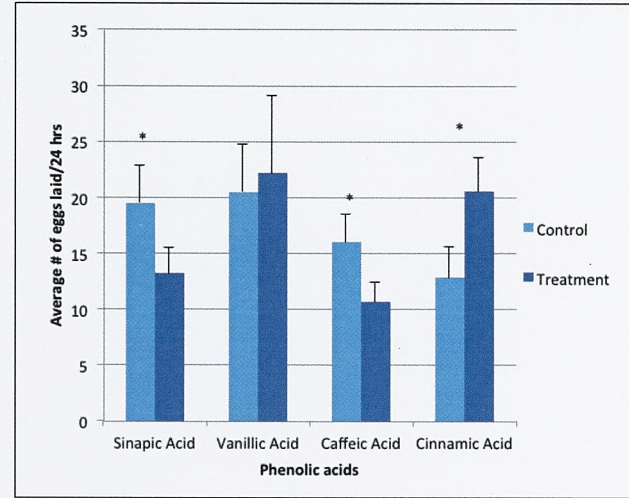


Figure 1. Effects of sinapic, vanillic, caffeic, and cinnamic acids on *Pieris rapae* oviposition. Error bars represent standard error of the mean. Asterisks denote p -value < 0.05 .

that five of the eight phenolic acids tested had a significant effect on oviposition. Walker et al. (2014) suggested that the variability in effects of phenolic acids may be influenced by the chemical structure of the

compounds. However, in examining how the chemical structure of phenolic acids relate to effect (deterrent, stimulatory, or no effect) with the additional acids included in our study, no consistent trends

were observed. Cinnamic, caffeic, *p*-coumaric, and ferulic acid all have similar structures; however, three caused a stimulatory effect and one caused a deterrent effect. Differential responses of females to the types of phenolic acids suggest that it may not be possible to make broad generalizations about their effects on ovipositional decisions and underscores the importance of assessing individual chemicals.

There are many factors besides plant secondary metabolites that might have an effect on *P. rapae* oviposition. The studies of Traynier (1986) have shown that *P. rapae* associate visual cues with the presence of possible stimulants and suggest that the size and coloration of Brassicaceae plants influence *P. rapae* oviposition. The nutritional value of Brassicaceae plants could also play a role in *P. rapae* oviposition (Walker et al., 2014). *P. rapae* female butterflies want to lay their eggs on the healthiest plants

possible to secure the survival of their young and increase their overall fitness. Additionally, young Brassicaceae plants contain lower levels of phenolic compounds and may differ in the concentrations of other plant secondary metabolites. This may contribute to *P. rapae*'s preference for younger Brassicaceae plants, since sensory perception of phenolic acids has been demonstrated in *Pieris* caterpillars (van Loon 1990).

Pieris rapae caterpillars can cause considerable damage to Brassicaceae agriculture plants by large consumption rates and by contamination with excrement, which in turn makes the plants unmarketable (Hern et al., 1996). Understanding what chemicals, and other factors, serve as stimulants or deterrents for female oviposition may provide valuable information for avoiding or minimizing these negative effects of their larvae.

Literature Cited

- Hern, A., G. Edward-Jones, and R.G. McKinlay. 1996. A review of the pre-oviposition behaviour of the small cabbage white butterfly, *Pieris rapae* (Lepidoptera: Pieridae). *Annals of Applied Biology* 128:349-371.
- Mattila, P. and J. Hellström. 2007. Phenolic acids in potatoes, vegetables, and some of their products. *Journal of Food Composition and Analysis* 20:152-160.
- Renwick, J. A. A. 1989. Chemical ecology of oviposition in phytophagous insects. *Experientia* 45: 223-228.
- Renwick, J. A. A. and C. D. Radke. 1988. Sensory cues in host selection for oviposition by the cabbage butterfly, *Pieris rapae*. *Journal of Insect Physiology* 34:251-257.
- Renwick, J. A. A., C. D. Radke, and K. Sachdev-Gupta. 1989. Chemical constituents of *Erysimum cheiranthoides* deterring oviposition by the cabbage butterfly, *Pieris rapae*. *Journal of Chemical Ecology* 15:2161-2169.
- Richards, O.W. 1940. The biology of the small white butterfly (*Pieris rapae*), with special reference to the factors controlling its abundance. *Journal of Animal Ecology* 9: 243-288.
- Schoonhoven, L.M., J.J.A. van Loon, and M. Dicke. 2005. *Insect-Plant Biology*. Oxford: Oxford University Press.
- Traynier, R.M.M. 1986. Visual learning in assays of sinigrin solution as an oviposition releaser for the cabbage butterfly, *Pieris rapae*. *Entomologia Experimentalis et Applicata* 40:25-33.
- van Loon, J.J.A. 1990. Chemoreception of phenolic acids and flavonoids in larvae of two species of *Pieris*. *Journal of Comparative Physiology* 166:889-899.
- Walker, K.S., J.L. Bray, M.E. Lehman, and A.J. Lentz-Ronning. 2014. Effects of host plant phenolic acids and nutrient status on oviposition and feeding of the cabbage white butterfly, *Pieris rapae*. *BIOS* 85:95-101.



Designers:

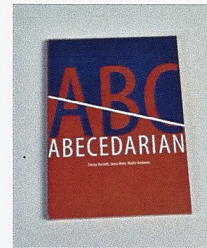
Emma Beckett

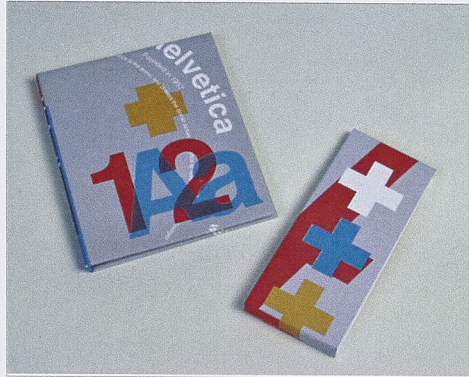
Jason Ware

Mollie Andrews

"Abecedarian Cards"
2014

Christopher Register, faculty advisor





Designers:

James Bates
Landon Cooper
Tiffani Jeffries
Maria Wheaton

"Helvetica: A Type Specimen Book"
2014

Christopher Register, faculty advisor

Artist:

Dallas Price

"Things Left Behind"

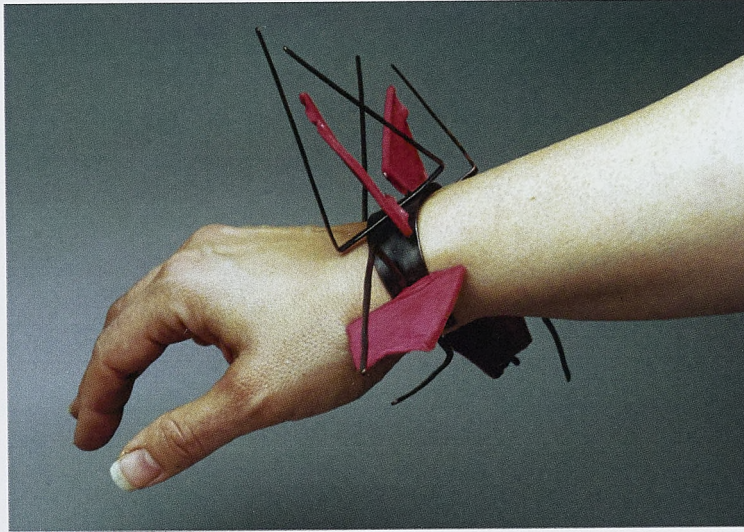
variable installation

Handmade paper (sheet formed & casted), Digital text transfer, Dirt
2014

Kerri Cushman, faculty advisor



My interest lies in examining the effects of immigration and how it relates to personal narratives. Why do people risk their lives in an effort to bypass the system, and leave their families behind as they journey across the border into the United States? Is this going to make one's life better or will their families left behind even benefit from all the obstacles and labor they face in the States? My piece started out as just an interpretation of the water bottles left behind in the desert. However, as I began interviewing people and hearing their stories, I found out that I needed to go deeper than what I saw on the surface. In each story that I listened to, I realized a part of them was left behind on their journey. Like the water bottles in the desert, the re-telling of their journey was a reminder of the life they left behind. My pieces scatter across the dirt so the viewer can interact with each book, and see the bottles like a husk, holding the different stories of each unique individual. This installation is meant to give a voice to those who are sometimes disregarded or seen as a nuisance, when in reality, they are only seeking what many Americans believe they are born entitled to.



Artist:

Laura Kahler

"Heretic Adornment"

*Handmade pigmented paper (abaca), Copper
2014*

Kerri Cushman, faculty advisor

Jewelry is almost always used as a means of adornment. Heretic Adornment is the result of examining Medieval torture devices. These implements have always interested me, for they are meant to draw out the process of punishment no matter the device. While researching and juxtaposing jewelry and papermaking, I chose to combine the ferocity of metal with the delicacy of paper. Changing the direction of the torture outward instead of inward, the danger is not to the wearer but to the outside environment. The Heretics Fork is a medieval device that is basically a doubled-ended fork that is placed between the offender's throat and chest; they must hold their head up in order to not pierce their skin. It was meant push the person to the exhaustive point where they could no longer hold their head up and allow it to drop in tire. The Heretics Fork greatly influenced the piece, in that the person wearing the adornment is in charge of their fate. They are protecting these vulnerable body parts, such as the wrist, neck, and head. Taking abaca fiber that was beaten and pressed, I wrapped the prongs that shoot outward from the cuff and studs. The pigmented paper and patina-dipped copper evoke a less dangerous form of beauty through translucency and color. The ferocity of the beauty is just below the surface.



Photographer:

Sarah Charlton

2014

Mike Mergen, faculty advisor

I am drawn towards the unknown. This house in Farmville has been abandoned for many years, yet so many belongings have been left untouched. What has been left behind says a lot about the person who owned it. I am photographing the objects I find in the home as well as the structure of the house. In doing so I want to show how photography is an important tool needed to unlock the past.

Revisiting Longfellow: Expressing Universality through Accessibility

Anna Bultrowicz

Dr. Gordon Van Ness, faculty advisor

When Henry Wadsworth Longfellow was buried at Cambridge in March 1882 (Candido 103), he was one of the most influential poets of the 19th century both in the United States and across the Atlantic. Longfellow had achieved an unprecedented proto-celebrity status as a poet, responding to as many as twenty letters a day until four months before his death from admirers he personified as the “perfect stranger” (Irmscher 34). However, despite his unparalleled popularity lingering for nearly a generation after his death, Longfellow’s literary standing has since been sullied by a slew of 20th-century modernist critics. “Such excessive literary inflation,” reasoned Newton Arvin, “could not possibly have any stability, and nothing could have been more foreseeable[...] than that Longfellow’s overblown reputation was due for a peculiarly complete collapse” (318-19). Cast

aside as simplistic and superficial by distinguished American critics such as Van Wyck Brooks, George Santayana, and Ludwig Lewisohn, a reappraisal of the validity of the criticism Longfellow received and an analysis of the universality of his themes, particularly in *The Song of Hiawatha*, has been long overdue—not to mention the topical significance of his poetry and whether or not this merits modern analysis. Largely overlooked in contemporary studies as a result of his thorough erasure from literary prominence at the dawn of the 20th century, when scrutinized alongside other monumental transcendentalist poets of the age Longfellow’s poetry exhibits concepts and themes akin to Whitman’s avant-garde universal unity. However, the accessibility of his writing, one of the central reasons for its dismissal, serves the dual-function of conveying complex universal themes in lay terms

comparable to Whitman’s and acting as a medicinal mode of escapism for America as she was experiencing the precession of what would be one of her greatest moments of dissen- and instability: the Civil War.

“Longfellow is to poetry what the barrel-organ is to music,” condemned Brooks in 1915 (Arvin 320)—essentially, as Lewis Mumford later concurred, insignificant (321). Despite his ascent into literary stardom, Longfellow’s reputation has since been ravaged by an onslaught of scathing reviews by influential critics such as Brooks, Santayana, and Lewisohn. Brooks, who contended that American literature was divided between “meaningless realism and a meaningless idealism” (Hoopes 100) with seldom gray area in between, grouped Longfellow into the former category, failing to recognize any “artistic instinct” in his poetry (100). As the 20th century commenced, the

fledgling generation of critics and writers subscribed to Brooks’s assessment: “To young writers who were deeply troubled about the aridity, the sterility, the spiritual uncreativity of American generally, and who were turning to the American past in the hopes of discovering moral and intellectual ancestors there[...] Longfellow inevitably seemed to hold out an empty hand” (Arvin 320). Particularly in the shadow of literary goliaths such as Emerson and Whitman, Longfellow’s poetry seemed to lack the philosophy to direct his “social instinct” (Hoopes 100). His descent into obscurity was marked by Santayana and Brooks’s deliberate exclusion of Longfellow from an American canon centered on Emerson and Whitman, a successful attempt to break the trend of genteel tradition that dominated the 19th century and of which Longfellow in particular personified (Willis 629). As Arvin described,

Longfellow was no “poète maudit”; he was born in idyllic Portland, Maine, and raised under a well-established, respected surname (1-6). Longfellow was denounced as “detached from contemporary America” (321), a sentiment generally echoed by the 20th-century writers and critics to come. As Lewisohn had said, “Who, except wretched schoolchildren, now reads Longfellow?” (Arvin 321).

Yet his appeal to the nation’s “wretched schoolchildren” is precisely what allowed Longfellow to thrive and achieve the status of one of the nation’s most beloved poets. Melodic rhyme schemes and clear themes characterized Longfellow’s poetry with an accessibility that the literary giants that shared his day had not offered—“It was in him rather than in Walt Whitman that the public saw the long-awaited incarnation of the native bard who at last gave America the sense and

measure of her literary potential and glory” (Salska 611). While Brooks perceived the simplicity of Longfellow’s poetry as superficiality and a lack of artistic depth (Hoopes 100), letters from Longfellow to his father in which he wrote, “Nothing can be advantageous to a person’s writing, which has a tendency to injure his style, and to bring him into a superficial way of thinking” (Longfellow 128), reveal an aversion to rigid structure and the insubstantiality that it yields. Rather, Longfellow utilized a simplistic style to develop a pattern of inviting accessibility that emerges throughout his poetry: in *The Song of Hiawatha* (“Stay and read this rude inscription,/Read this *Song of Hiawatha!*” [Longfellow 5]), and in *The Day Is Done* (“Read from some humbler poet,/Whose songs gushed from his heart” [Longfellow 25-6]). This repetitive assurance serves to engage who Lewisohn

and Herbert Gorman would refer to as the American “semi-literate” or “subliterary” (Irmscher 34) in the controversial and, in its complexity, intimidating concept of a universal unity of mankind, particularly in *The Song of Hiawatha*. Appealing to both “university professors and servant girls alike” (3) allowed Longfellow to extend his influence over a sizably wider and more inclusive audience than singularly more complicated poets such as Whitman; Longfellow introduced poetry as “a public idiom in the United States and abroad” (Irmscher 3). In short, Longfellow’s mass appeal resulted from the accessibility and ease of his poetry; he was a people’s poet.

However, he was a people’s poet not only in the sense that his writing was easily accessible to a broad audience, but that he advocated a universal unity in the United States that overlooked entrenched societal dividers such

as race and ethnicity. Longfellow’s poetry encouraged American society to experience feelings of kinsmanship and unity, in particular with the long abused Native American population. While Longfellow did not present the concept that all men and women are innately one as Whitman does, he puts forth the idea that all men and women share a certain quality in the fact that they are all human—an approach to unity more grounded in the concrete than Whitman’s abstract one. This concept is depicted in *The Song of Hiawatha*, where Longfellow writes, “Every human heart is human,/That even in savage bosoms/There are longings, yearnings, strivings/For the good they comprehend them with a unique history and culture of their own not” (Longfellow 4). *The Song of Hiawatha* was Longfellow’s attempt to introduce Native American mythology and folklore into white American society, a

method of humanizing the Native American people by portraying them with historical past and culture engaging to white readers. However, Longfellow's poetry also sympathizes with the Jewish people and African American slaves, as shown in *The Jewish Cemetery at Newport* and *The Slave Singing at Midnight*. In the former, Longfellow writes, "How came they here? What burst of Christian hate;/What persecution, merciless, and blind,/Drove o'er the sea,—that desert, desolate—/These Ishmaels and Hagars of mankind" (Longfellow 29-32), controversially showing favor for the Jewish people at the expense of depicting Christians in a positive moral light. Finally, Longfellow bemoaned the plight of African American slaves in *The Slave Singing at Midnight*—however, noticeably in sympathizing with the slaves Longfellow repeatedly references the Hebrew religion, writing, "Loud he sang the psalm of

David!/He, a Negro and enslaved,/Sang of Israel's victory,/Sang of Zion, bright and free" (Longfellow 1-4). Longfellow's connecting the discrimination of the Jewish people to the discrimination of the African American slaves acted to associate seemingly wholly different and diverse ethnic groups by exposing common factors within them—in this case their shared oppression. In this approach, Longfellow recognized that the greatness of the nation lay in her inclusiveness.

That said, dismissing the topical facet of Longfellow's poetry as irrelevant in contemporary literary studies carelessly overlooks the significance of authorial intent in American literature. Topical poetry offers primary insight into the past passions and dreads of American society, allowing a fuller and more comprehensive understanding of the society from which today's gradually emerged, and therefore

granting greater insight into present and future America. Longfellow's works served to soothe a fledgling nation rapidly disintegrating into the eruption of the Civil War in 1861, extending an offer of escapism and comfortability in stanzas such as, "Come, read to me some poem,/Some simple and heartfelt lay,/That shall soothe this restless feeling, and banish the thoughts of day" (Longfellow 13-16). While Longfellow's poetry put forth cosmopolitan themes of a unity of mankind that transcended superficial attributes such as ethnicity, it simultaneously allowed for the relaxed and optimistic interpretation that marked him as one of the five fireside poets. Lines such as "And the night shall be filled with music,/and the cares, that infest the day,/Shall fold their tents, like the Arabs,/and as silently steal away" (Longfellow 41-4) encourage the optimistic escape of America's amassing struggles with slavery

and political dissension in the early to mid-1800s. The versatility of Longfellow's poetry, the juxtaposition of its universality against an embracing accessibility, permits it to express simultaneously artistic and societal depth and operate as an undemanding, medicinal mode of escapism.

In conclusion, dismissing Longfellow's poetry as insignificant in its simplicity demonstrates a superficial analysis that fails to examine authorial intent in the writing. The reason his work is so often denounced as superficial, its accessibility, is precisely the reason Longfellow was capable of expressing concepts as complex as Whitman's while still reaching an audience that extended beyond universities and the well-educated, becoming one of the most popular poets of the 19th century and achieving a literary eminence and admiration in his time rarely

rivaled. Despite experiencing a slight revival, Longfellow is oft overlooked in contemporary study, seemingly resonating the sentiment that Arvin expressed: "Certainly Longfellow will never again 'enjoy' the excessive popularity he enjoyed in his own time and for some years afterward, and this is as it should be" (324). Perhaps, however, the time has come to begin reexamining the significant role that Longfellow played in 19th-century literature and what universality can be scrutinized in his poetry under the lens of contemporary studies in American literature.

Works Cited

- Arvin, Newton. *Longfellow His Life and Work*. Boston: Little, Brown, 1962. Print.
- Candido, Igor. "European Influences and American Identity in Longfellow's Dantism." *Dante Studies* 128 (2010): 103-23. *JSTOR*. Web. 20 Jan. 2015
- Hoopes, James. *Van Wyck Brooks: In Search of American Culture*. Amherst: U of Massachusetts, 1977. Print.
- Irmscher, Christoph. *Longfellow Redux*. Urbana: U of Illinois, 2006. Print.
- Longfellow, Henry Wadsworth. "The Day Is Done." (Ed. Nina Baym and Robert S. Levine. *The Norton Anthology of American Literature*. Vol. B) New York: W. W. Norton, 2012. 600-01. Print.
- . "Introduction." *The Song of Hiawatha*. New York: Bounty, 1968. 3-4. Print.
- . "The Jewish Cemetery at Newport." (Ed. Nina Baym and Robert S. Levine. *The Norton Anthology of American Literature*. Vol. B) New York: W. W. Norton, 2012. 602-04. Print.
- . "The Slave Singing at Midnight." (Ed. Nina Baym and Robert S. Levine. *The Norton Anthology of American Literature*. Vol. B) New York: W. W. Norton, 2012. 599-600. Print.

---. "To Stephen Longfellow." *The Letters of Henry Wadsworth Longfellow*. Ed. Andrew Hilen. Vol. 1. Massachusetts: Belknap of Harvard UP, 1966. 128-29. Print.

Salska, Agneizka. "From National to Supranational Conception of Literature: The Case of Henry Wadsworth Longfellow." *ATQ* 20.4 (2006): 611. *Ebsco*. Web. 20 Nov. 2014.

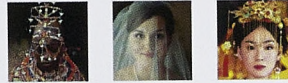
Willis, Lloyd. "Henry Wadsworth Longfellow, United States National Literature, and the Canonical Erasure of Material Nature." *ATQ* 20.4 (2006): 629. *Ebsco*. Web. 22 Nov. 2014.

STARTING WITH THE HEAD ...

Women's garb and dress has always reflected a combination of their social status and society's role for women. In particular, the wedding dress holds significant religious, social, and familial weight.

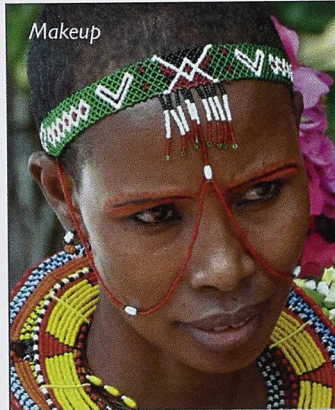
Across the world, brides are held to varying standards, and are often mirrored or paired with symbols of good fortune, new life or new start, a joining of two families, love, and purity of mind, body, and soul.

Four particular cultures, America, Maasai, India, and Korea, while seeming to be so vastly different due to geographic and religious standpoints, are actually more similar than most would believe. While religious customs may contrast, the preparation and garments of a bride reflect across the oceans.



India: A ghunghat, (veil), draped modestly over the hair is a sign of respect to the deities worshipped and the elders present.
Maasai: Braiding, necklaces and headwraps vary between tribes, representing the wealth of the bride's family.
America: Veils are worn as a symbol of chastity, first lowered by the father and later lifted by the groom.
Korea: Headdresses are made to resemble the crowns of royalty, highlighting the importance of the bride.

Makeup



Maasai: Red, signifies unity, and is incorporated into clothing and hair parts to honor their first family (the husband).
America: Makeup accentuates the natural beauty of the bride and corresponds to the color scheme of the wedding.
Korea: Red dots help represent the "blushing bride" and the lips are accented with pink gloss.
India: Khol (kohl) rims the eyes or ward off bad luck and neutral eye shadow helps brighten the eyes.



Designer:

Emily Spittle

*"What Dreams May Come:
 Marriage Across Cultures"
 2014*

Wade Lough, faculty advisor



What is Human Trafficking?

Human trafficking is the trade in humans, most commonly for the purpose of sexual slavery, forced labor or commercial sexual exploitation. It is often within a country or transnationally, it is thought to be one of the fastest growing activities of transnational criminal organizations. Sex trafficking is the most common form of modern-day slavery. Estimates place the number of its domestic and international victims in the millions, mostly females and children produced in the commercial sex industry. The term usually conjure up images of young girls beaten and abused in seamy places where sexually is happens throughout the United States, right in citizens' backyards.



only made \$50 that night to give back to the pimp. As a result, he beat me in front of the other girls to make an example out of me and then he made me go back out until I had made the money. That's the same man that took me out to eat, listened to me when I wanted to complain about my parents, gave me words of advice. I had never seeing a side of him that I never saw before—a brutal side where he repeatedly hit me in front of the other girls to teach us all a lesson. Not only was I shocked, I was scared. What would happen to me?

I didn't know who to leave and who would believe me if I told them what was going on. I worked from 6 until 10 p.m. the next night without eating or sleeping. I came back with the \$500, but in his mind I still hadn't earned my money. He sent me back outside until 11 a.m. the next morning. After the second day, he finally brought me something to eat, but as a punishment to learn never to defy him again, he locked me in the closet. Since that night, I was locked in the closet on numerous occasions and had my finger broken, which never set right. We endured our pain by pushing it deep down and trying to forget it happened.

"I was 14 years old when I was forced into prostitution"

"What happened to me 15 years ago is still going on today"

I can't count the number of times people have asked me "why didn't you just leave?" "Couldn't you escape?" To me, I simply say, "So you ask a child that is kidnapped why they didn't try to leave?" No, we automatically say they are a victim. I support that fact. Pimps prey on young women and girls by finding their weaknesses and then exploiting it. It is easier to manipulate children, and by the time children become adults, they are broken down and dependent on a pimp. After they bring you into your mind, it's easy for him to maintain control, much like a domestic abuser. From then on you have to call him "daddy" and he will punish you if he feels like you have stepped out of line. You are required to bring him \$500-\$2,000 every night.

You are not a woman, you are always a "broth" or a "ho" and are re-sold at their daily. You are part of the "stable." If you do not want to follow the rules, then he may sell you to another pimp. What happened to me 15 years ago is still going on today.

Designer:

Erin Godwin

*"Live on the Streets:
A Naked Look at
Human Sex Trafficking"
2014*

Wade Lough, faculty advisor



Artist:

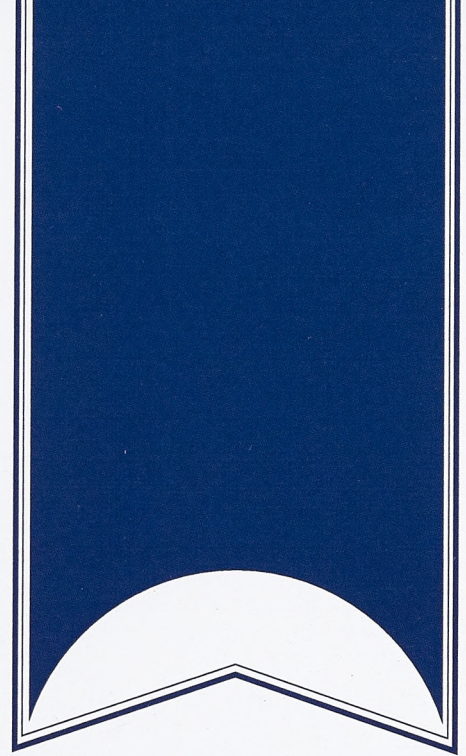
Eamon Brokenbrough

"Lasting Light"

2014

Mike Mergen, faculty advisor

I grew up in the rural South. When I was younger and I would be stuck to my dad's hip for an errand run, it would be rare when he would not encounter someone to talk to. It seemed to me that all people ever wanted to talk about was the past and I could never understand why. Looking back on the past to me has always been a way of holding onto home. But time goes on and home shifts. In this project I wanted to document the shifting of my home, the South. Where many things hold traces of older times and more detail a changing. My work isn't about what the South will become, it's about what it was and observing what it may be. Like a conversation with a friend from the past; all I have to share is history with reflections of the future.



INCITE

Journal of Undergraduate Scholarship
Cook-Cole College of Arts & Sciences
Longwood University

